

Listing of Claims

Claim 1 (previously presented): A method for extracting a nonferrous, rare or precious metal from an ore, comprising

treating the ore with an oxygen-containing oxidant in the presence of a solvent and a reducing agent that has donor-acceptor properties, whereby the oxygen-containing oxidant and the reducing agent react to generate reaction products that oxidize or form complexes with said metal, thereby extracting said metal from the ore,

wherein the method is performed in an environment where agents forming complexes with the metal are selected from the group consisting of the ore, the oxygen-containing oxidant, the solvent, the reducing agent, and products of their reactions.

Claim 2 (original): The method of claim 1, wherein the ore includes robust minerals.

Claim 3 (original): The method of claim 1, wherein the ore includes a carbonaceous component.

Claim 4 (original): The method of claim 1, wherein the ore includes more than one nonferrous, rare or precious metals.

Claim 5 (original): The method of claim 1, wherein the metal is selected from the group consisting of gold, silver, platinum, palladium, copper, cobalt and nickel.

Claim 6 (original): The method of claim 1, wherein the solvent is acidic.

Claim 7 (original): The method of claim 6, wherein the solvent is a hydrochloric acid solution.

Claim 8 (original): The method of claim 1, wherein the oxygen-containing oxidant is selected from the group consisting of: persulfate, hypochlorite, perchlorate, iodate, bromate and any combination thereof.

Claim 9 (original): The method of claim 1, wherein the reducing agent is selected from the groups consisting of: nitrite, sulfite, thiosulfite and any combination thereof.

Claim 10 (original): The method of claim 1, wherein the reaction products include radicals.

Claim 11 (original): The method of claim 1, wherein the reactions products are capable of oxidizing more than one metal, said more than one metal being selected from the group consisting of nonferrous, rare and precious metal.

Claim 12 (previously presented): A method for recovering nonferrous, rare or precious metals, comprising:

combining in a solution an oxygen-containing oxidant and a donor-acceptor reducing agent to form additional oxidizing agents, the oxygen-containing oxidant and said additional oxidizing agents reacting with a nonferrous, rare or precious metal in an ore, to transfer said metal to the solution,

wherein the method is performed in an environment where agents forming complexes with the metal are selected from the group consisting of the ore, the oxygen-containing oxidant, the solvent, the reducing agent, and products of their reactions.

Claim 13 (previously presented): A method for a liquid phase recovery of a nonferrous, rare or precious metal from an ore, the method comprising treating an ore that includes nonferrous, rare or precious metals with an oxygen-containing oxidant, and with oxidizing agents formed by reactions between the oxygen-containing oxidant and a donor-acceptor reducing agent, to form metal compounds that dissolve in the liquid phase, thereby extracting the nonferrous, rare or precious metal from the ore,

wherein the method is performed in an environment where agents forming complexes with the metal are selected from the group consisting of the ore, the oxygen-containing oxidant, the solvent, the reducing agent, and products of their reactions.

Claim 14 (previously presented): A method for recovering nonferrous, rare or precious metals from an ore, the method comprising:

combining the ore with an oxygen-containing oxidant in the presence of a solvent;
reacting at least a portion of the oxygen-containing oxidant with a donor-acceptor reducing agent to forms radicals and reducing agent oxidation products; and

reacting said radicals and reducing agent oxidation products with nonferrous, rare or precious metals in the ore, to form soluble metal compounds, thereby recovering the nonferrous, rare or precious metals from the ore,

wherein the method is performed in an environment where agents forming complexes with the metal are selected from the group consisting of the ore, the oxygen-containing oxidant, the solvent, the reducing agent, and products of their reactions.

Claim 15 (original): The method of claim 14, wherein the ore includes robust minerals.

Claim 16 (original): The method of claim 14, wherein the ore includes a carbonaceous component.

Claim 17 (original): The method of claim 14, wherein the nonferrous, rare or precious metals are selected from the group consisting of gold, silver, platinum, palladium, copper, cobalt and nickel.

Claim 18 (original): The method of claim 14, wherein the solvent is acidic.

Claim 19 (original): The method of claim 18, wherein the solvent is a hydrochloric acid solution.

Claim 20 (original): The method of claim 14, wherein the oxygen-containing oxidant is selected from the group consisting of: persulfate, hypochlorite, perchlorate, iodate, bromate and any combination thereof.

Claim 21 (original): The method of claim 14, wherein the reducing agent is selected from the group consisting of: nitrite, sulfite, thiosulfite and any combination thereof.